In The Claims:

- 1 1. A method for transmitting
- 2 communications signals to a plurality of mobile
- 3 terminals, comprising:
- 4 processing a received signal at a ground
- 5 hub;
- 6 radiating said signal through multiple
- 7 paths to at least two satellites;
- 8 re-radiating said signal from said at least
- 9 two satellites to an intended mobile terminal;
- 10 perturbing the inclination and eccentricity
- 11 of said at least two satellites relative to the same
- 12 geosynchronous reference orbit;
- whereby the periods of geosynchronous
- 14 orbits of said at least two satellites remain
- 15 substantially constant.
- 1 2. The method of claim 1, further
- 2 comprising:
- 3 radiating a signal from said intended
- 4 mobile terminal to said at least two perturbed
- 5 satellites;
- 6 re-radiating said signal from said at least
- 7 two perturbed satellites to said ground hub.
- 1 3. The method of claim 2, further
- 2 comprising:
- determining a relationship between said
- 4 inclination and said eccentricity of said satellites

- 5 such that they appear to move at a constant speed
- 6 along circular paths whose centers are located at the
- 7 position of a hypothetical reference satellite in an
- 8 unperturbed geosynchronous orbit.
- 1 4. The method of claim 3, further
- 2 comprising:
- maintaining the geometry of said cluster of
- 4 at least two satellites such that the distances
- 5 between any two of said satellites is relatively
- 6 constant.
- 1 5. The method of claim 4, further
- 2 comprising:
- 3 adding additional satcllites to said at
- 4 least two satellites to augment the satellite
- 5 constellation.
- 1 6. The method of claim 4, wherein the
- 2 conditions for circular apparent motion of the
- 3 perturbed satellite relative to said satellite
- 4 constellation center is approximated by the
- 5 following:
- $\sin i = 2\varepsilon$ $t_n = \pm \chi T_{GEO}$
- 7. A mobile wireless communication
- 2 system, comprising:
- a satellite constellation consisting of a
- 4 plurality of satellites each in a slightly perturbed
- geosynchronous orbit;

each of said plurality of satellites being 6 7 capable of relaying signals between the ground hub and the plurality of user terminals in either 8 direction; 9 said satellite constellation 10 whereby as the apparent inter-satellite to rotate appears 11 spatial relationships are maintained. 12 wireless communication mobile 8. The 1 system of claim 7, wherein each of said plurality of 2 inclination and eccentricity satellites has its 3 common geosynchronous relative to а perturbed reference orbit. 5 ı 9. The mobile wireless communication 1 system of claim 8, wherein the orbit of each of said 2 plurality of satellites is perturbed such that it 3 appears to move at a constant speed along a circular 4 path as viewed by a single user. 5 The mobile wireless communication 1 10. system of claim 7, wherein the respective distances 2 the said plurality QΪ satellites is substantially constant. communication mobile wireless 11. The 1 system of claim 9, wherein the conditions 2 circular apparent motion of the perturbed satellite relative to said satellite constellation center is

approximated by the following:

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$$\sin i = 2\varepsilon$$

$$t_o = \pm \frac{1}{4} T_{GEO}$$

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mobile wireless communication 12. The 1 system of claim 7, wherein in order for coherent 2 reception of signals by their intended user, said intended user's location must be determined to within specified tolerance \mathcal{E}_{r} , which is determined 5 according to the following equation:

$$\mathcal{E}_{x} < \frac{\mathcal{E}_{tol} \lambda_{\min} r_{\min}}{\Delta D_{x \max}}$$

1 13. The mobile wireless communication 2 system of claim 7, wherein in order for incoherent 3 reception of signals from interfering (non-intended) 4 users, said interfering users must be displaced at 5 least a distance

$$\Delta x_{\min} \ge \frac{cr_{\max}}{2W_N \delta \Delta D_{x \min}}$$

7 from the user receiving the signal

1 14. The mobile wireless communication 2 system of claim 11, wherein the apparent motions of 3 said plurality of satellites in said satellite 4 constellation can be arranged to appear circular as 5 perceived from any one point in the coverage area.

1 15. A method for establishing a link 2 between a ground hub and a plurality of mobile 3 terminals, comprising:

- 4 preprocessing a received signal at said
- 5 ground hub;
- 6 transmitting said signal through a
- 7 plurality of satellites in a satellite constellation
- 8 to an intended one of the mobile terminals;
- 9 perturbing the inclination and eccentricity
- 10 of said plurality of satellites relative to a common
- 11 geosynchronous reference orbit; and
- 12 determining a relationship between said
- 13 inclination and said eccentricity of said plurality
- 14 of satellites such that they appear to move at a
- 15 constant speed along circular paths where centers are
- 16 located at a position defined by a hypothetical
- 17 reference satellite in an unperturbed geosynchronous
- 18 orbit.
- l 16. The method of claim 15, further
- 2 comprising:
- maintaining the periods of geosynchronous
- 4 orbit of said plurality of satellites substantially
- 5 constant.
- 1 17. The method of claim 15, further
- 2 comprising:
- maintaining the apparent inter-satellite
- 4 spatial relationships between said plurality of
- 5 satellites as they appear to rotate.
- 1 18. The method of claim 15, wherein said
- 2 relationship is approximated by the following:

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$$\sin i = 2\varepsilon$$

$$t_o = \pm \frac{1}{4} T_{GKO}$$

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1 19. The method of claim 15 wherein in 2 order for incoherent reception of signals from 3 interfering (non-intended) users, said interfering 4 users must be displaced at least a distance

$$\Delta X_{MIN} \ge \frac{Cr_{MAX}}{2W_N \delta \Delta D_{xMIN}}$$

- 6 from the user receiving the signal.
- 1 20. The method of claim 15, wherein in 2 order for coherent reception of signals by their 3 intended user, said intended user's location must be 4 determined to within a specified tolerance \mathcal{E}_x , which 5 is determined according to the following equation:
- $\mathcal{L}_{x} \ll \frac{\mathcal{L}_{tol} \ \tau_{\min} \ r_{\min}}{\Delta_{x \ \text{min}}}$

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